



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038-0236

Nuclear Business Unit

MAY 4 1999

LR-N990201

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Dear Sir:

HOPE CREEK GENERATING STATION
DOCKET NO. 50-354
UNIT 1
LICENSEE EVENT REPORT 98-008-01

This supplement to Licensee Event Report entitled "Engineered Safety Feature Actuation -- Automatic Reactor Scram Due to Turbine Trip Caused by High Moisture Separator Level" is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(i)(B).

Sincerely,

Mark Bezilla
General Manager -
Hope Creek Operations

CEM

C Distribution
LER File

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Attachment A

The following items represent the commitments that the Public Service Electric and Gas Company is making to the Nuclear Regulatory Commission relative to LER 354/98-008-01:

1. An event driven Technical Specification matrix has been developed and appropriate portions will be incorporated into procedures by June 7, 1999.

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NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (6-1998)	APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001 Estimated burden per response to comply with this mandatory information collection request 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)	

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TITLE (4)
 Engineered Safety Feature Actuation - Automatic Reactor Scram Due to Turbine Trip Caused by High Moisture Separator Level

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
11	15	98	98	-- 008 --	01	05	04	99	FACILITY NAME	DOCKET NUMBER
										05000
										05000

OPERATING	1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)									
		20.2201(b)			20.2203(a)(2)(v)			<input checked="" type="checkbox"/>	50.73(a)(2)(i)		50.73(a)(2)(viii)
POWER	95	20.2203(a)(1)			20.2203(a)(3)(i)				50.73(a)(2)(ii)		50.73(a)(2)(x)
		20.2203(a)(2)(i)			20.2203(a)(3)(ii)				50.73(a)(2)(iii)		73.71
		20.2203(a)(2)(ii)			20.2203(a)(4)			<input checked="" type="checkbox"/>	50.73(a)(2)(iv)		OTHER
		20.2203(a)(2)(iii)			50.36(c)(1)				50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
		20.2203(a)(2)(iv)			50.36(c)(2)				50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)	
NAME C. Manges, Licensing Engineer	TELEPHONE NUMBER (Include Area Code) 609-339-3234

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)				EXPECTED		
YES (If yes, complete EXPECTED SUBMISSION DATE).	<input checked="" type="checkbox"/>	NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On November 15, 1998, at approximately 0922, the main turbine tripped due to "A" moisture separator high level and the reactor scrambled automatically in response to the closure of the turbine control valves. All control rods inserted properly and all safety related equipment performed as designed, with the exception of safety relief valve "D" which opened prematurely, and the Reactor Protection System channel "B1" reactor pressure vessel steam dome pressure - high signal which was received 1.3 seconds after the redundant signals. This event was initiated by the inadvertent isolation of instrument air from the "A" and "B" moisture separator drain tank (MSDT) normal level control valves and the failure of the "A" MSDT dump valve to open. After the automatic scram, Surveillance Requirements for suppression chamber-drywell vacuum breakers and for the Average Power Range Monitor neutron flux-upscale setdown function were not performed as required by Technical Specifications. There were no safety consequences associated with this event. Corrective actions include testing the MSDT dump valves and developing an event driven Surveillance Requirements matrix.

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TEXT (If more space is required, use additional copies of NRC Form 366A) (17)

PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
Instrument Air System - EIIS Identifier {LD/--}*
Main Turbine System - EIIS Identifier {SN/--}*
Reactor Protection System {JC/--}*
Containment Atmosphere Control System - EIIS Identifier {BF/--}*
Energy Industry Identification System (EIIS) codes and component function
identifier codes appear as {SS/CC}

IDENTIFICATION OF OCCURRENCE

Event Date: November 15, 1998
Discovery Date: November 15, 1998

CONDITIONS PRIOR TO OCCURRENCE

The plant was in OPERATIONAL CONDITION 1 (POWER OPERATIONS), at approximately 95% of rated thermal power. There were no structures, systems, or components that were inoperable at the beginning of the event that contributed to the event.

DESCRIPTION OF OCCURRENCE

On November 15, 1998, plant operators were in the process of isolating the instrument air supply to a steam seal evaporator level control valve as part of a feedwater heater string planned maintenance evolution. At approximately 0921, a moisture separator high/low level alarm was received in the control room. At approximately 0922, the main turbine tripped due to "A" moisture separator high level and the reactor scrambled automatically in response to the closure of the turbine control valves. All control rods were verified to be fully inserted. The main turbine trip from high power caused reactor pressure to spike above the setpoints for the low-low set relief logic. The low-low set safety relief valves (SRVs) "H" and "P" opened as required to control reactor pressure. SRV "D" also opened briefly, although reactor pressure did not exceed the lift setpoint specified in Technical Specification (TS) 3.4.2.1. Both reactor recirculation pumps tripped automatically as required by the end-of-cycle recirculation pump trip (EOC-RPT) system following the turbine trip.

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DESCRIPTION OF OCCURRENCE (continued)

During the transient following the scram, reactor water level reached Level 3 (12.5 inches). All valves required to close automatically at that level were already closed.

On November 15, 1998 at 1127, a four hour notification was made to the NRC in accordance with 10 CFR 50.72(b)(2)(ii). This event is also reportable pursuant to 10 CFR 50.73(a)(2)(iv) as an event that resulted in automatic actuation of an Engineered Safety Feature (ESF).

The suppression chamber-drywell vacuum breakers were cycled satisfactorily at approximately 1253, three hours and thirty one minutes after the SRV opening. This did not meet the time limit in TS Surveillance Requirement (SR) 4.6.4.1.b.1 which requires each vacuum breaker to be cycled within two hours after any discharge of steam to the suppression chamber from the safety relief valves. Failure to demonstrate vacuum breaker OPERABILITY by cycling each vacuum breaker would result in the INOPERABILITY of the vacuum breakers. With all of the vacuum breakers INOPERABLE in HOT SHUTDOWN, TS 3.0.3 applies. Entry into TS 3.0.3 is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by Technical Specifications.

On November 17, 1998, PSE&G concluded that the surveillance requirement for the Average Power Range Monitor (APRM) neutron flux-upscale setdown function had not been satisfied following the automatic scram. SR 4.3.1.1-1.a requires a CHANNEL FUNCTIONAL TEST of this APRM function at least once per seven days while in OPERATIONAL CONDITION 3. The upscale setdown function CHANNEL FUNCTIONAL TEST had been performed recently, but not within seven days before the scram. The upscale setdown function is not required to be OPERABLE in OPERATIONAL CONDITION 1. The ACTION requirements of TS 3.3.1.b for inoperable APRMs were met after the scram until approximately 1317 on November 16, 1998. At this time, with the minimum OPERABILITY requirements for Source Range Monitors and Intermediate Range Monitors met, the administrative controls to ensure compliance with the ACTION requirements of TS 3.3.1 were removed. These same controls were also required for the APRMs. Without these administrative controls in place, the reactor mode switch was not maintained locked in the shutdown position and control rods were exercised. As a result, LCO 3.3.1 and its associated ACTION requirements were not satisfied. At approximately 0921 on November 17, 1998, the APRMs were declared inoperable and the ACTION requirements of TS 3.3.1 were again met. The period of non-compliance with TS requirements is reportable pursuant to 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by Technical Specifications.

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DESCRIPTION OF OCCURRENCE (continued)

The post reactor scram review of the sequence of events identified a delay in receipt of the reactor vessel steam dome pressure - high signal for reactor protection system channel "B1". The channel "B1" trip signal was received approximately 1.3 seconds after the signals from the redundant RPS channels. Reactor pressure exceeded the scram setpoint after a full scram signal had already been generated in response to the turbine control valve closure. Troubleshooting during this forced outage did not identify the cause for the delay in receipt of the channel "B1" signal. The channel "B1" pressure transmitter and the trip output relay were replaced as a precautionary measure before plant restart.

APPARENT CAUSE OF OCCURRENCE

This event was initiated by the inadvertent isolation of instrument air from the "A" and "B" moisture separator drain tank (MSDT) normal level control valves. This caused the normal level control valves on both drain tanks to close. The "A" MSDT dump valve (1ACLV-1039A) failed to open in response to the resulting increase in water level, and the main turbine tripped automatically in response to a high high water level in the "A" moisture separator.

The inadvertent isolation of instrument air to the MSDT normal level control valves was due to an error in the piping and instrumentation diagram (P&ID) for the instrument air system. The P&ID was used to prepare safety tagging to isolate instrument air to the "A" feedwater heater string in preparation for a system maintenance outage. A valve used for safety tagging also supplied instrument air to the MSDT normal level control valves. However, this was not shown on the P&ID. The drawing error was the result of personnel error during system walkdowns performed in 1990 and 1991. The walkdown results were used to revise the P&ID without first being independently verified.

The cause for the failure of 1ACLV-1039A to open when required is attributed to sticking that resulted from iron oxide build-up in the close tolerances of the plug/seat area. After the scram, the valve was tested satisfactorily. The valve was also tested satisfactorily at approximately 25% power with the moisture separators in service on November 24, 1998 during plant restart.

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APPARENT CAUSE OF OCCURRENCE (continued)

The cause for the premature opening of SRV "D" was setpoint drift. The valve was removed from the plant and setpoint testing was performed during the eighth refueling outage. The as found value was 1.0% low at 1119 psig. The difference between the as found setpoint and the recorded pressure during the scram was 39 psig. Elevation differences between the valve and the pressure tap used to record reactor pressure accounts for 34 psi. Instrument loop accuracy for the pressure instrumentation is ± 12 psi. The premature opening of the "D" SRV can therefore be explained by the setpoint drift and the instrument loop inaccuracy. Steam line vibration caused by the opening of SRV "H" which opened as required by the low-low set relief logic may have contributed to the premature opening of the "D" SRV. SRVs "D" and "H" are adjacent to each other on main steam line "D". Previous experience indicates that vibration transmitted to the SRV pilot assembly may cause the setpoint spring to relax momentarily, causing the valve to open at a pressure lower than its safety function setpoint.

The failure to demonstrate vacuum breaker OPERABILITY by cycling each vacuum breaker within the required time is the result of personnel error.

The failure to satisfy the surveillance requirement for the Average Power Range Monitor (APRM) neutron flux-upscale setdown function was the result of personnel error.

Troubleshooting during this forced outage did not identify the cause for the delay in receipt of the channel "B1" signal. The channel "B1" pressure transmitter and the trip output relay were replaced as a precautionary measure before plant restart. Subsequent testing determined that the transmitter was slow.

SAFETY SIGNIFICANCE AND IMPLICATIONS

There were no safety consequences associated with the automatic turbine trip and reactor scram. All control rods inserted properly and, with the exception of the premature opening of SRV "D" and the delayed RPS channel "B1" reactor pressure vessel steam dome pressure - high signal, all safety related equipment performed as designed. Since SRV "D" reclosed at the expected pressure with no indication of excessive seat leakage, there is little likelihood that the valve was adversely affected by the premature opening. However, the SRV set pressure cannot be verified for installed valves, so SRV "D" was declared inoperable for the safety valve function

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SAFETY SIGNIFICANCE AND IMPLICATIONS (Continued)

Required by TS 3.4.2.1. The SRV was subsequently found to be within the Technical Specification allowable setpoint tolerance ($\pm 1\%$) when tested during the eighth refueling outage. Since SRV set pressure does not affect the ability of the automatic depressurization system (ADS) to perform its design function, SRV "D" is still OPERABLE for the ADS function required by TS 3.5.1.d.

There were no safety consequences associated with the failure to demonstrate vacuum breaker OPERABILITY by cycling each vacuum breaker within the required time. All the vacuum breakers performed satisfactorily when cycled. The delay in demonstrating OPERABILITY had no effect on the vacuum breakers' ability to perform their design function.

There were no safety consequences associated with the failure to satisfy the surveillance requirement for the Average Power Range Monitor (APRM) neutron flux-upscale setdown function. The delay in performing the CHANNEL FUNCTIONAL TEST had no effect on the APRMs' ability to perform their design function since the neutron flux-upscale setdown function was subsequently tested satisfactorily. In addition, the Intermediate Range Monitors were OPERABLE during the period of non-compliance and would have provided a diverse RPS trip initiation if required.

There were no actual safety consequences associated with the delay in receipt of the reactor vessel steam dome pressure - high signal for RPS channel "B1". Reactor pressure exceeded the scram setpoint after a full scram signal had already been generated in response to the turbine control valve closure and the three redundant channels functioned properly.

There was no effect on the health and safety of the public as a result of this event.

PREVIOUS OCCURRENCES

There have been no other automatic scrams at Hope Creek within the last two years.

One previous instance in which an SRV opened prematurely occurred on October 2, 1994 after an automatic scram following a main turbine trip. This was reported in LER 354/94-014-00. During that event, SRV "K" opened after the low-low set SRVs opened. SRVs "K" and "P" are adjacent to each other on main steam line "B". SRV "K" was declared inoperable for the remainder of the operating cycle and was replaced during the next refueling outage.

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A review of previously reported events identified no instances within the last two years in which there was a failure to demonstrate vacuum breaker OPERABILITY by cycling each vacuum breaker within the required time.

CORRECTIVE ACTIONS

1. SRV "D" was declared inoperable for the safety valve function required by TS 3.4.2.1.
2. The moisture separator drain tank dump valves were tested satisfactorily while shutdown and again during restart with the moisture separators in service at approximately 25% power.
3. PSE&G opened and inspected the "A" moisture separator drain tank dump valve. The results of this inspection identified conditions that led to the revised cause for the failure to open that is discussed in the apparent cause section of this LER.
4. A walkdown to verify configuration will be performed prior to tagging any portion of the instrument air system. This corrective action will be in effect until corrective action 5 is completed.
5. The portions of the instrument air system that are inaccessible during power operations were reviewed to ensure that the P&ID correctly depicts the loads for each header isolation valve. Actions have been initiated to correct errors identified during the review. The portions of the system that are accessible at power will be reviewed before the start of the next refueling outage.
6. Lessons learned from this event have been reviewed with operating shifts.
7. An event driven Technical Specification matrix has been developed and appropriate portions will be incorporated into procedures by June 7, 1999.
8. The individuals involved in the missed Technical Specification Surveillance Requirements have been held accountable in accordance with company policy.
9. The channel "B1" pressure transmitter and the trip output relay were replaced as a precautionary measure before plant restart.

CATEGORY 1

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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SUBJECT: Forwards LER 98-008-01, re ESFA - automatic reactor scram due to turbine trip. Commitments made by util encl.

DISTRIBUTION CODE: IE22T COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 2+1
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NOTES:Application for permit renewal filed.

05000354

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